

What is claimed is:

- 1 1. A method of providing hydraulic pressure for mechanical work from an engine  
2 lubricating system in an internal combustion engine, the steps comprising:
  - 3 a) supplying oil from a variable displacement pump to an engine lubrication  
4 gallery for lubricating the engine;
  - 5 b) supplying oil from the variable displacement pump to at least one engine  
6 accessory having a variable oil demand, the accessories each having  
7 individual pressure regulators;
  - 8 c) regulating the output of the variable displacement pump to a sum of fluid  
9 flow required by the engine lubrication system and demand of fluid  
10 generated by the individual pressure regulators of the engine  
11 accessories regardless of engine output.
- 1 2. The method of claim 1, wherein at least one engine accessory is a hydraulic motor  
2 driven cooling fan.
- 1 3. The method of claim 1, wherein at least one engine accessory is a power steering  
2 system.
- 1 4. The method of claim 1, wherein at least one engine accessory is a hydraulic motor  
2 driven air conditioning compressor.
- 1 5. The method of claim 1, wherein at least one engine accessory is a hydraulic motor  
2 driven engine coolant pump.
- 1 6. The method of claim 1, wherein at least one engine accessory is a hydraulic motor  
2 driven alternator.
- 1 7. The method of claim 1, wherein at least one engine accessory is a hydraulic motor  
2 driven supercharger.
- 1 8. The method of claim 1, wherein at least one engine accessory is an electrohydraulic  
2 valve actuation system.

1 9. The method of claim 1, wherein at least one engine accessory is a suspension actuator  
2 motor.

1 10. The method of claim 1, wherein the fluid flow for lubricating the engine is based on  
2 engine parameters.

1 11. A hydraulic on-demand engine accessory drive system for an internal combustion  
2 engine comprising:

3 a variable displacement pump mounted to a front cover of an engine block  
4 having a fluid communication input from a sump and an fluid  
5 communication output to a high pressure manifold;

6 a variable displacement pump controller mounted to the variable  
7 displacement pump and in communication with an ECU;

8 at least one engine accessory having variable oil demand and an individual  
9 pressure regulator, wherein the pressure regulator is in fluid  
10 communication with and has an input from the high pressure  
11 manifold and an output to the sump;

12 wherein the output of the variable displacement pump is regulated by the  
13 variable displacement pump controller to a sum of flow required by  
14 the individual pressure regulator of the at least one engine accessory  
15 and lubrication of the engine, regardless of engine output.

1 12. The system of claim 11, wherein the high pressure manifold powers the individual  
2 pressure regulator.

1 13. The system of claim 11, wherein the ECU monitors sensors on the engine.

1 14. The system of claim 13, wherein the sensors monitor temperature and speed of the  
2 engine.

1 15. The system of claim 11, wherein at least one engine accessory is a hydraulic motor  
2 driven cooling fan.

- 1 16. The system of claim 11, wherein at least one engine accessory is a power steering  
2 system.
- 1 17. The system of claim 11, wherein at least one engine accessory is a hydraulic motor  
2 driven air conditioning compressor.
- 1 18. The system of claim 11, wherein at least one engine accessory is a hydraulic motor  
2 driven engine coolant pump.
- 1 19. The system of claim 11, wherein at least one engine accessory is a hydraulic motor  
2 driven alternator.
- 1 20. The system of claim 11, wherein at least one engine accessory is a hydraulic motor  
2 driven supercharger.
- 1 21. The system of claim 11, wherein at least one engine accessory is an electrohydraulic  
2 valve actuation system.
- 1 22. The system of claim 11, wherein at least one engine accessory is a suspension actuator  
2 motor.
- 1 23. The system of claim 11, further comprising an oil cooler in the output of the at least  
2 one engine accessory to the sump.